10th Class 2015

Biology	Group-II	Paper-II
Time: 2.45 Hours	(Subjective Type)	Max. Marks: 63

Part-I

2. Write short answers to any Six (6) questions: 12

(i) What are Lenticels? Write their functions.

Ans In woody stems and mature roots, the entire surface is covered by bark which is impervious to gases or water. However, there are certain pores in the layer of bark. These are called the lenticels. The lenticels allow air to pass through them.

(ii) Why does blood become thick due to smoking?

Ans Many chemicals in smoke increase the production of blood platelets. When platelets are more than the normal numbers, they make the blood thick and it can lead to arteriosclerosis.

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(iii) Define Alveoli.

Ans The alveoli form the respiratory surface in human body. Each alveolus is a sac-like structure lined by a single layer of epithelial cells. It is bound on the outside by a network of capillaries.

(iv) Define hydrophytes with an example.

Ans Hydrophytes are the plants which live completely or partially submerged in freshwater. Such plants do not face the problem of water shortage. The most common example of such plants is water lily.

(v) What is meant by osmosis?

Ans Osmosis is the spontaneous net movement of solvent molecules through a semi-permeable membrane into a region of higher solute concentration, in the direction that tends to equalize the solute concentrations on the two sides.

(vi) Write four names of parts of urinary system.

Ans Urinary system is also called the excretory system of humans. It is formed of one pair of kidneys, a pair of uretors, a urinary bladder and a urethra.

(vii) What is meant by myelin sheath?

Ans Schwann cells are special neurological cells located at regular intervals along axons. In some neurons, Schwann cells secrete a fatty layer called myeline sheath, over axons.

(viii) What do you know about spinal cord?

Ans The spinal cord is, in fact, a tubular bundle of nerves. It starts from brain stem and extends to lower back.

(ix) What is meant by somatic nervous system?

Ans Somatic nervous system is responsible for the conscious and voluntary actions. It includes all of the motor neurons that conduct impulses from CNS to skeletal muscles.

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3. Write short answers to any Five (5) questions: 10

(i) What is osteoporosis? Give at least one reason for this disease.

Ans Osteoporosis is a bone disease in adults, especially in old people. It is more common in old women. In osteoporosis, there is a decrease in the density of bones due to loss of calcium and phosphorus. It may be due to malnutrition, lack of physical activities or deficiency of estrogen hormone.

(ii) Differentiate between biceps and triceps muscles.

Ans Biceps is a flexor muscle on the front of the upper arm bone while triceps is an extensor muscle on the back of arm.

(iii) Differentiate between Gout and Osteoarthritis.

Ans Both are the types of arthritis which means "inflammation in joints".

Gout is characterized by the accumulation of uric acid crystals in moveable joints. It generally attacks the toe joints.

While, osteoarthritis is due to degeneration in the cartilage, present at joints or due to decreased lubricant production at joints. In this arthritis, fusion of the bones at joint may occur and joints may become totally immoveable.

(iv) Differentiate between tissue culture and cloning.

Ans Cloning is the latest method of vegetative propagation. In this method, identical offsprings are produced from a single parent using its vegetative tissue or cell.

While tissue culture is the technique applied in this method.

(v) Write down the names of reproductive parts of flower.

Ans Basically, male reproductive part of the flower is androecium while female part is gynoecium.

The units of androecium are called stamens. Each stamen has a thread-like filament at the free end of which anther is attached. Anther has pollen-sacs.

The units of gynoecium are called carpels or pistils. Each carpel is made up of the basal ovary, middle style and upper stigma. Inside ovary, there are one to many ovules.

(vi) Differentiate between translation and transcription.

Ans During protein synthesis, the sequence of DNA nucleotides decides the sequence of amino acids. For this purpose, the specific sequence of DNA neucleotides is copied in the form of messenger RNA nucleotides. This process is called transcription.

The messenger RNA (mRNA) carries the sequence of its nucleotides to ribosome. The ribsome reads this sequence and joins specific amino acids, according to it, to form protein. This step is known as translation.

(vii) State the Law of Segregation of Mendel.

Ans In each organism, the genes are present in pairs. During gamete formation, the genes of each pair segregate from each other and each gamete receives one gene from the pair. When the gametes of male and female parents unite, the resulting offspring again gets the genes in pairs. These conclusions were called the law of segregation.

(viii) What do you mean by Phenotype and Genotype?

Ans The specific combination of genes in an individual is known as genotype. The expression of this genotype in the form of trait is known as the phenotype.

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4. Write short answers to any Five (5) questions: 10

(i) What is biosphere?

Ans All ecosystems of the world together form the biosphere. In other words, the biosphere consists of all organisms present on the Earth and all regions of the Earth where they live. Biosphere ranges from the floor of oceans to the tops of the highest mountains. It is about 20 (KM) thick.

(ii) What do you mean by trophic level?

Ans In an ecosystem, energy as well as materials travel from one trophic level to the next. Trophic (food) level is the level at which an organism feeds in food chain. The first trophic level is made of producers; the second of primary consumers and so on.

(iii) Define predation.

Ans It is an interaction between two animals of different species or between a plant and an animal. In predation, one organism attacks, kills and feeds on other organism.

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(iv) **What type of help genetic engineering has provided to control Haemophilia and Thalassemia?**

Ans

1. Haemophilia is the inherited disease. Through genetic engineering, it has become possible to modify the genes in the human egg cell which can lead to the elimination of such diseases.
2. Genetic engineering techniques can also be used to cure blood diseases like thalassemia, which result from defects in single genes. Normal genes could be transferred into the bone marrow.

(v) **Define glycolysis.**

Ans Glycolysis is a process in which a molecule of glucose is broken into two molecules of pyruvic acid.

(vi) **Define genetic engineering.**

Ans Genetic engineering is the artificial synthesis, modification, removal, addition and repair of the genetic material (DNA).

(vii) **Define pharmacology.**

Ans Pharmacology is the study of drug composition, properties and medical applications. The sources of drugs are also studied in pharmacology.

(viii) **Write about some drugs from plants and fungi.**

Ans These medicines include antibiotics, cardiotonics and certain analgesics. The antibiotic pencillin comes from a fungus. The cardiotonic known as digitalis, is used to stimulate the heart. The pain reliever morphine is made from opium, which comes from the juice of opium poppy plant.

Part-II

NOTE: Attempt any Three (3) questions.

Q.5.(a) What is pneumonia? Describe its causes, symptoms and treatment. (4)

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Ans **Pneumonia:**

Pneumonia is an infection of lungs. If this infection affects both lungs, it is called double pneumonia.

Causes of pneumonia:

The most common cause of pneumonia is a bacterium, Streptococcus pneumoniae. Some viral (influenza virus) and fungal infections may also lead to pneumonia. Poor oxygenation is another cause of pneumonia.

Symptoms:

1. Cold, that is followed by a high fever, shivering, and a cough with sputum production.
2. Patient may become short of breath.
3. Patient's skin colour may change and become dusky or purplish.

Treatment:

Vaccines are available to prevent pneumonia caused by S. pneumoniae. Antibiotics are used in the treatment of this type of pneumonia.

(b) Write osmotic adjustments in Hydrophytes and Halophytes. (3)

Ans **Hydrophytes:**

Hydrophytes are the plants which live completely or partially submerged in freshwater. Such plants do not face the problem of water shortage. They have developed mechanisms for the removal of extra water from the cells. Hydrophytes have broad leaves with a large number of stomata on their upper surfaces. This characteristic helps them to remove the extra amount of water. The most common example of such plants is water lily.

Halophytes:

Halophytes live in sea waters and are adapted to salty environments. Salts enter in the bodies of such plants due to their higher concentration in sea water. On

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the other hand, water tends to move out of their cells into the hypertonic sea water. When salts enter into cells, plants carry out active transport to move and hold large amount of salts in vacuoles. Salts are not allowed to move out through the semi-permeable membrane of vacuoles. So the sap of vacuoles remains even more hypertonic than sea water. In this way, water does not move out of cells. Many sea grasses are included in this group of plants.

Q.6.(a) Describe in detail the Nerve Cell or Neuron. (4)

Ans **Nerve cell or neuron:**

Nerve cell or neuron is the unit of the nervous system. The human nervous system consists of billions of neurons plus supporting cells. Neurons are specialized cells that are able to conduct nerve impulses from receptors to coordinators and from coordinators to effectors. In this way, they communicate with each other and with other types of body cells.

Dendrites and Axons:

The nucleus and most of the cytoplasm of a neuron is located in its all body. Different processes extend out from cell body. These are called dendrites and axons. Dendrites conduct impulses towards cell body and axons conduct impulses away from cell body.

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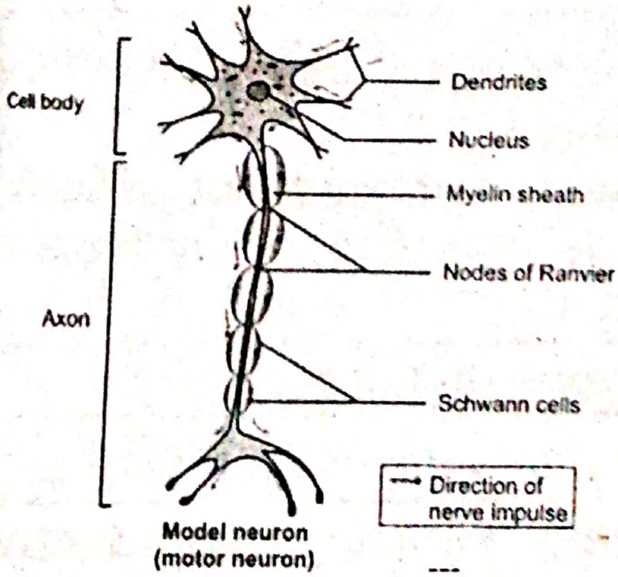
Cell body
Dendrites
Nucleus
Myelin sheath
Nodes of Ranvier
Axon
Schwann cells
Direction of nerve impulse
Model neuron (motor neuron)

Fig. Neurons.

Schwann Cells:

Schwann cells are special neurological cells located at regular intervals along axons.

Myelin sheath:

Schwann cells secrete a fatty layer called myelin sheath, over axons.

Nodes of ranvier:

Between the areas of myelin on an axon, there are non-myelinated points, called the nodes of ranvier.

Saltatory impulses:

Myelin sheath is an insulator so the membrane coated with this sheath does not conduct nerve impulse. In such a neuron, impulses 'jump' over the areas of myelin going from node to node. Such impulses are called saltatory (jumping) impulses. This increases the speed of nerve impulse.

Types of neurons:

On the basis of their functions, neurons are of three types:

(i) Sensory neurons:

These neurons conduct sensory information from receptors towards the CNS. Sensory neurons have one dendrite and one axon.

(ii) Interneurons:

Interneurons form brain and spinal cord. They receive information, interpret them and stimulate motor neurons. They have many dendrites and axons.

(iii) Motor neurons:

Motor neurons carry information from interneurons to muscle or glands (effectors). They have many dendrites but only one axon.

(b) Explain types of Joints. (3)

Ans For Answer see Paper 2014 (Group-I), Q.6.(b).

Q.7.(a) Describe Female Reproductive System of Rabbit. (4)

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Ans For Answer see Paper 2014 (Group-I), Q.7.(b).

(b) Explain germination of seed. Describe its two types. (3)

Ans **Germination:**

Seed germination is a process by which a seed embryo develops into a seedling. During germination, embryo soaks up water which causes it to swell, splitting the seed coat.

Root is the first structure that emerges from the radicle present in seed. It grows rapidly and absorbs water and nutrients from soil. In the next phase, plumule develops into tiny shoot which elongates and comes out of soil.

On the basis of the elongation of hypocotyl and epicotyl, there are two types of germination:

(i) Epigeal germination:

In epigeal germination, the hypocotyl elongates and forms a hook, pulling the cotyledons above ground. Beans, cotton and papaya are the examples of seeds that germinate this way.

(ii) Hypogeal germination:

In hypogeal germination, the epicotyl elongates and forms the hook. In this germination, the cotyledons stay underground. Pea, maize and coconut germinate this way.

Q.8.(a) Why did Mendel select the sweet pea for his experiment? Write some of its characteristics. (4)

Ans **Reasons for selecting the sweet pea:**

Mendel selected pea plant to carry out a large number of experiments. In his writings, he gave reasons for this selection.

Characteristics of any organism:

He argued that an organism for genetic experiments should have the following characteristics:

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1. There should be a number of different traits that can be studied.
2. The organism should have contrasting traits, e.g., for the trait of height there should be only two very different phenotypes, *i.e.*, tallness and dwarfness.
3. The organism (if it is a plant) should be self-fertilizing but cross fertilization should also be possible.
4. The organism should have a short but fast life cycle.

Characteristics of sweet pea:

Mendel studied seven characteristics of sweet pea. Each of them has two different conditions:

1. Round seeds and wrinkled seeds.
2. Long stem length and short stem length.
3. Green pod colour and yellow pod colour.
4. Green seed colour and yellow seed colour.
5. Flower position is axial and terminal.
6. Flower colour is purple and white.
7. Flat pod shape and constricted pod shape.

(b) Write the names of steps of nitrogen cycle and explain only one. (3)

Ans Within the atmosphere, there is about 79% nitrogen. The living organisms cannot get this nitrogen from the atmosphere except nitrogen fixing bacteria. Firstly, this nitrogen is converted into nitrates and nitrites and then the plants absorb them. The important steps of nitrogen cycle are:

(i) Nitrogen fixation
(ii) Ammonification and nitrification
(iii) Assimilation
(iv) Denitrification

Here we explain only one, *i.e.*,

(i) Nitrogen fixation:

The conversion of nitrogen gas into nitrates is called as nitrogen fixation. In the atmosphere, nitrogen is fixed by various ways. During thunderstorm, the atmospheric nitrogen forms oxides of nitrogen. These oxides combine with rainwater and form nitrous acid and nitric acid. Then these acids combine with other salts to form nitrites and nitrates. This is called as 'atmospheric nitrogen fixation'. In 'industrial nitrogen fixation', hydrogen is combined with atmospheric nitrogen under high pressure and temperature to produce ammonia. It is converted into ammonium nitrate. While in 'biological nitrogen fixation', the nitrogen-fixing bacteria found in the root nodules of leguminous plants, fix the atmospheric nitrogen into nitrates.

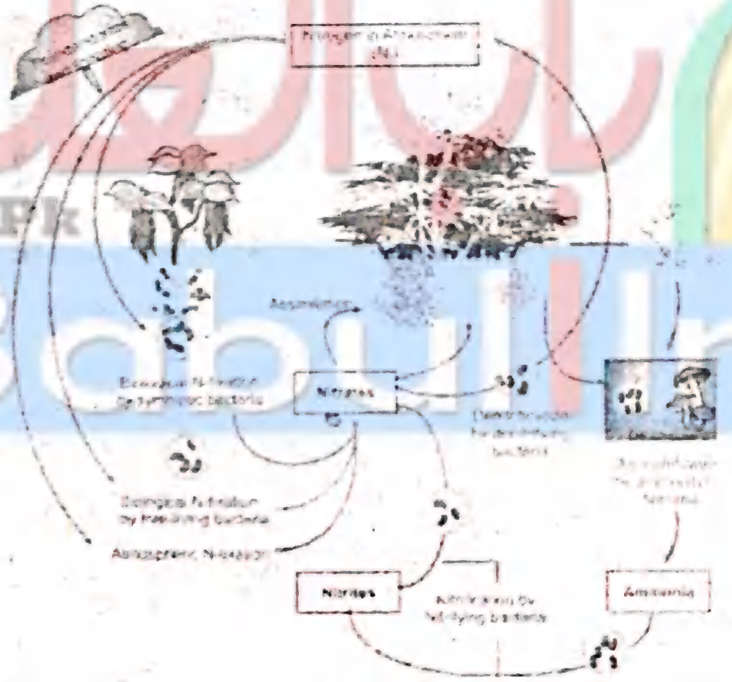

Fig. Nitrogen cycle.

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Q.9.(a) Explain basic steps in Genetic Engineering.

Ans The important steps of genetic engineering are as follows:

(i) Isolation of the gene of interest:

Firstly, the genetic engineer identifies the gene of interest in the donor organism. Special enzymes like restriction endonucleases are used to cut the identified gene from the DNA of donor organism.

(ii) Insertion of gene into vector:

A vector is selected for the transfer of isolated gene of interest to the host cell. The vector may be plasmid (extrachromosomal DNA present in many bacteria) or a bacteriophage. The gene of interest is attached with the vector DNA by using endonuclease (breaking enzyme) and ligase (joining enzyme). The vector DNA and the attached gene of interest are collectively called as recombinant DNA.

(iii) Then the recombinant DNA is transferred to a target host cell. In this way, the host organism is changed into genetically modified organism (GMO).

(iv) Then a suitable culture medium is provided to GMO for growth to give as much copies of the gene of interest as needed.

(v) The GMO contains the gene of interest and manufactures the desired product. Then this product is isolated from culture medium.

(b) **Differentiate between medicinal and addictive drugs.** (3)

Ans **Medicinal Drugs:**

Various diseases have been made easier to treat in recent years by the production of medicinal drugs. Drugs are obtained from the following sources:

(i) Sythetic drugs:

Such drugs do not occur naturally but are synthesized in laboratory. Pharmaceutical companies produce these drugs, *e.g.*, aspirin.

(ii) Drugs from plants and fungi:

Many important medicines are obtained from plants and fungi. These medicines include antibiotics, cardiotonics and certain analgesics.

(iii) Drugs from animals:

Drugs obtained from animals are usually their glandular products. Fish liver oils, musk, bee's wax,

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certain harmones and antitoxins are obtained from animal sources.

(iv) Drugs from minerals:

Several common drugs are produced from minerals. The mineral iodine is used in making tincture of iodine, a liquid that helps prevent infection when applied to cuts and bruises.

(v) Drugs from bacteria:

Many antibiotics *e.g.*, streptomycin are obtained from bacteria.

Addictive Drugs:

If the medicinal drugs are used in a wrong way, they will be addictive drugs. Major types of these drugs are such as under:

(i) Sedatives:

These drugs interact with central nervous system to depress its activities. Sedative drugs induce dizziness, lethargy, slow brain function and depression. Long-term use of sedatives induce suicidal thoughts.

(ii) Narcotics:

Narcotics are strong painkillers. These drugs are often prescribed in conjunction with other less potent painkillers. These are used to relieve pain for patients with chronic diseases such as cancer. But some people may abuse narcotics for ecstatic effects. For example, morphine and codeine are the narcotics, derived from opium (poppy).

(iii) Hallucinogens:

Hallucinogens are the drugs that cause changes in perception, thought, emotion and consciousness. For example, Marijuana is a hallucinogen, which is smoked. It is obtained from the flowers, stems and leaves of the marijuana plant. High doses of marijuana increase the heart rate. It also affects the production of sperms in men and also weakens the short-term memory.

Part-III

(Practical Part)

A-(i) Write the procedure of demonstration of the presence of tar in cigarette smoke. (3)

Ans For Answer see Paper 2015 (Group-I), Q.A-(i).

(ii) What is meant by Dead Space? (2)

Ans Dead space is the volume of air which is inhaled that does not take part in the gas exchange.

B-(i) Write the observations of binary fission in Amoeba. (3)

Ans **Materials required:**

Prepared slides, photomicrographs and charts showing binary fission im Amoeba, microscope.

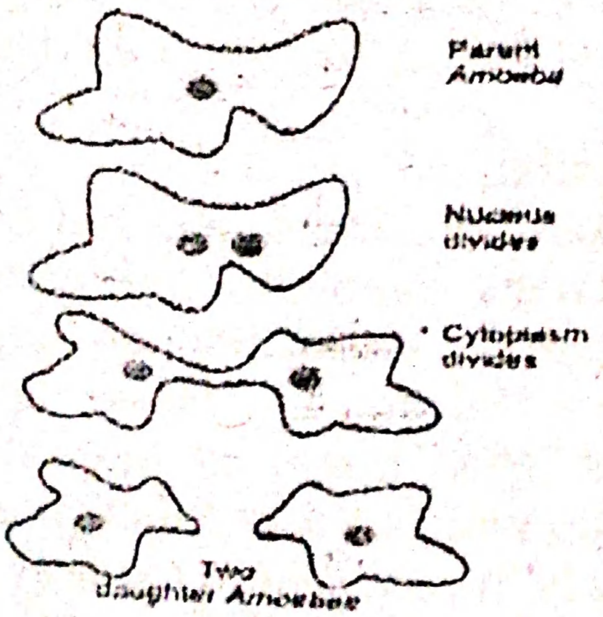
Procedure:

(1) Study the stages of binary fission in Amoeba from photomicrographs or charts.

(2) Observe the prepared slide of binary fission in Amoeba under the low and high powers of microscope.

(3) Locate the different stages of the binary fission.

Observation:



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After observation, we have come to know; in binary fission, the parent organism divides into two daughter organisms of equal size. Binary fission takes place when the conditions are favourable.

(ii) What do you know about stem tuber of potato? (2)

Ans A stem tuber is a swollen underground stem which stores food, survives the winter, and gives rise to new plants the following year. These are aggregations of tiny buds in the form of eyes. Each bud develops into a shoot that grows upward and also produces roots.

C-(i) Draw and label a diagram of internal structure of maize grain. (3)

Ans

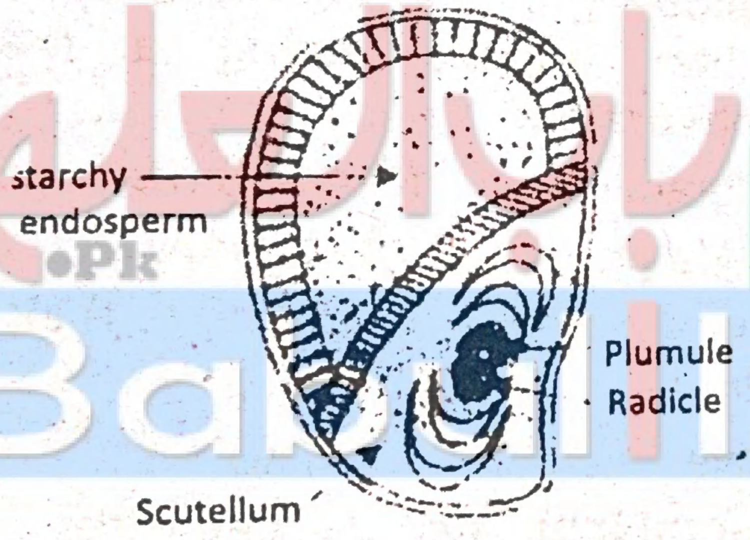

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Fig. Maize seed.

(ii) Is there any role of lactic acid fermentation in human body? (2)

Ans Lactic acid, a chemical compound, is naturally present in humans as well as in animals. It is well-known that it is formed from glycogen by muscle cells when the oxygen supply is inadequate to support energy production.